

ABUNDANCE, AGE, SEX, AND SIZE STATISTICS  
FOR SOCKEYE, CHUM, AND PINK SALMON IN LOWER COOK INLET, 1993.



by

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## ABSTRACT

Aerial and foot surveys were used to estimate 1993 sockeye *Oncorhynchus nerka*, chum *O. keta*, and pink *O. gorbuscha* salmon escapements into Lower Cook Inlet. Age, length, and weight samples were obtained from commercial fisheries directed at seven sockeye salmon stocks and one chum salmon stock, as well as from spawning escapements into five sockeye salmon spawning systems. A total of 233,834 sockeye, 4,367 chum, and 866,774 pink salmon were harvested in the Lower Cook Inlet management area. Another 55,056 sockeye, 99,888 chum, and 774,286 pink salmon contributed to escapements. The dominant age classes of sockeye salmon throughout Lower Cook Inlet were 1.2, 1.3, 2.2, and 2.3. The proportion of females in sockeye salmon catch samples ranged from a low of 79% in the Ecstasy Lake commercial fishery to a high of 43% in the Douglas River subdistrict fishery. Sockeye salmon ranged in size from 474 mm in Kirschner Lake samples to 539 mm in the Douglas River subdistrict samples, and from 1.45 kg in Mikfik samples to 2.37 kg in Nuka Bay samples. The dominant age classes for chum salmon sampled this year were 0.3 and 0.4. The absence of age-0.5 chum salmon may be attributed to obtaining the samples late in the season.

KEY WORDS: Age, chum salmon, escapement, length, Lower Cook Inlet, pink salmon, *Oncorhynchus*, sex, sockeye salmon, weight

## INTRODUCTION

The Lower Cook Inlet management area for Pacific salmon *Oncorhynchus* spp. is composed of all waters west of Cape Fairfield in the Gulf of Alaska, north of Cape Douglas in Shelikof Straits, and south of Anchor Point in Cook Inlet. The area is divided into four management districts: Kamishak Bay, Southern, Outer, and Eastern (Figure 1). Purse seine and set gillnet are the only legal commercial gear types for salmon. Entry into commercial salmon fisheries was limited under law in 1972.

Documentation of catches of all five species of Pacific salmon in this area has occurred since 1961, but sampling of sockeye *Oncorhynchus nerka* and chum salmon *O. keta* catches for age, sex, weight and length (AWL) did not begin until the Alaska Department of Fish and Game (ADF&G) developed a program in 1970. AWL data between 1970 and 1986, and between 1988 and 1992, has been summarized by Schroeder (1984, 1985, 1986), Morrison (1987), and Yuen et al. (1989, 1990, 1991, 1992, 1994). No catch sampling occurred in 1987. Aerial and ground escapement surveys were started for pink salmon *O. gorbuscha* in 1960, chum salmon in 1964, and sockeye salmon in 1969. Annual escapement data are summarized in annual management reports for the Lower Cook Inlet Area (e.g., Bucher and Hammarstrom 1994).

Commercial fishing for a single species within a bay or drainage usually lasts three to six weeks. Sockeye salmon fisheries begin as early as June while pink and chum salmon fisheries begin in July. Both fisheries typically end in late August. Commercial fishing for chinook salmon *O. tshawytscha* has begun as early as May, and fishing for coho salmon *O. kisutch* has extended into September. Whenever possible, fishing districts have been established to facilitate management of discrete salmon stocks. Commercial harvests are managed to meet predetermined escapement goals and to obtain the escapement from all run segments of a stock.

The purpose of the Lower Cook Inlet salmon catch sampling program is to collect sockeye and chum salmon AWL data from the purse seine fisheries that target discrete stocks. These single-stock fisheries normally account for about 97% of the total sockeye and chum catch from Lower Cook Inlet. The purse seine fisheries in the Halibut Cove, Halibut Cove Lagoon, Tutka Bay, Douglas River, and the three set gillnet fisheries in Lower Cook Inlet were not sampled because they did not target specific local stocks. Chinook salmon samples also were not collected because total chinook salmon harvest was expected to be <1% of the total salmon catch. Coho and pink salmon catches normally are no longer sampled because these species do not exhibit great variation in annual age compositions.

This report summarizes the 1993 estimates of age and size composition for discrete stock sockeye and chum salmon fisheries and for those sockeye salmon escapements where a weak run precluded a fishery. Monitoring changes in age composition during the fishing season allows fishery managers to respond to unexpected strengths or weaknesses of a particular age group,



prepare preseason forecasts of abundance, and evaluate escapement goals. This report also summarizes methods used to derive escapement abundances from aerial and ground surveys.

## METHODS

The Lower Cook Inlet salmon harvest is managed as 16 independent purse seine fisheries, most of which target on a discrete stock of sockeye or chum salmon having its own escapement goal. One chum and eleven sockeye salmon stocks were sampled in 1993. Each stock was considered a geographical sampling stratum (Figure 2).

Most catch samples were obtained at processing plants as tenders were delivering catches from a single fishery. If tenders were expected to gather fish from several fisheries before returning to port, samples were obtained on board before salmon were put into the hold. The catch sampling crew interviewed fishers delivering salmon to determine the origin of the catch before taking any samples. If none of the above precautions could be taken, samples were obtained from a tender hold, if the skipper was able to confirm that no salmon from an earlier sampling period were present.

There were several weak sockeye and chum salmon runs this year and some of their associated fisheries were closed. Thus, age compositions were determined from limited otolith sampling of salmon carcasses in McNeil River, Aialik lake, Delight Lake, and a lake recently formed by glacial recession in the East Arm of Nuka Bay. (This lake is variously referred to as Delectable, Delusion, or Ecstasy, but will be called Ecstasy Lake within this report.) Escapement samples were also collected from the Chenik and English Bay Lake weirs, where scales were removed from live salmon.

Salmon were measured from mid-eye to fork of tail with an accuracy of  $\pm 1.0$  mm using a digital measuring board. Salmon were also weighed with a hand-held spring scale to the nearest 0.1 kg, and classified as either males or females using external secondary sexual characteristics. In some cases, sex was determined by making a small incision near the vent was made to inspect the gonads.

Scales were collected, when possible, from the *preferred area* of each salmon: an area approximately 3 rows above the lateral line and posterior of the dorsal fin. Scales were cleaned and mounted sculptured side up on gum cards. An acetate impression of each card was made and used for age determination. Images of these impressions were magnified 35x to count the number of annuli.

Otoliths were collected from carcasses by making an incision through the skull. Otoliths were stored dry in labeled glass vials. To view otoliths, they were dampened with either an alcohol or a 50% glycerine solution, placed against a black background, and magnified 30x. The number of dark (translucent) bands were counted to determine age.

All ages were recorded using the European system where the first digit represents the number of freshwater annuli and the second digit represents the number of marine annuli. Total age is the sum of the two digits plus one. For example, an age-1.2 salmon is four years old and has spent 2 years in fresh water (first winter spent in the gravel as an alevin) and 2 years at sea.

Age composition samples sizes for scale collections were set for each sampling stratum to estimate age proportions  $p_i$  from a population of  $k$  age groups simultaneously within a specified distance  $d$  of their true population age proportions  $\pi_i$ , 90% of the time  $(1 - \alpha)$ :

$$PR \left( \bigcap_{i=1}^k |p_i - \pi_i| \leq d \right) \geq 1 - \alpha , \quad (1)$$

where  $d$  was chosen to be 0.05 for all scale samples or 0.10 for some otolith samples, and  $\alpha$  was chosen to be 0.10. Also,  $\alpha_i = 2(1 - \Phi(z_i))$ ;  $\sum \alpha_i < \alpha$ ;  $\Phi(z_i)$  = area under the standard normal distribution; and  $z_i = d \sqrt{n_i / (p_i(1-p_i))}$ . Thompson (1987) determined that a maximum sample size of 403 was needed for the worst-case scenario in which three age groups were present in equal numbers, for  $d = 0.05$ , and  $\alpha = 0.10$ .

Sample sizes for mean weights ranged between 5 and 50 depending on  $\sigma$ . Most sample sizes were about 20 for a sample of 200 salmon (i.e. 1 of every 10 salmon of each sex were weighed).

Estimates of standard errors by age group were derived according to procedures for stratified random sampling described by Snedecor and Cochran (1967):

$$SE = \sqrt{\sum C_h^2 \frac{s_h^2}{n_h}} , \quad (2)$$

where  $C_h^2$  = the salmon catch in the  $h$ th stratum, and  $s_h^2$  = the sample variance in the  $h$ th stratum.

Catch totals were obtained from harvest receipts, commonly referred to as fish tickets, which document each sale by a licensed fisher. Salmon escapements in Lower Cook Inlet were estimated from periodic visual counts made by an observer in a fixed-wing aircraft flying over streams and lakes or by an observer walking the streams. These counts are usually adjusted for stream life, the length of time a spawning salmon is expected to be present in the stream or lake.

Pink salmon will enter and accumulate in a stream over a relatively short period of time, but most will die before the last survey is completed. Our method of estimating total pink and chum salmon escapements uses an estimate of stream life and is similar to that described by Johnson and Barrett (1988). First, daily surveys were converted to fish-days:

$$fish-days = \frac{(x_i + x_{i-1})}{2} (d_i - d_{i-1}) , \quad (3)$$

where  $d_i$  = Julian calendar date of survey  $i$  ( $1 < d < 365$ ) and  $x_i$  = number of live pink or chum salmon observed in the study stream during survey  $i$ . Then, the area-under-the-curve is found by integration,

$$area = \sum_{i=1}^{n+1} \frac{(x_i + x_{i-1})}{2} (d_i - d_{i-1}) , \quad (4)$$

where  $n$  = total number of surveys,  $x_0 = x_{n+1} = 0$ , early arriving salmon are not expected in the streams before 10 July ( $d_0$  = Julian date 191), and late arriving salmon are not expected after 15 September ( $d_{n+1}$  = Julian date 258), unless specified otherwise.

Finally, dividing fish-days by stream life, in this case 17.5 d, yields total estimated escapement in numbers of salmon,

$$escapement = \frac{\sum_{i=1}^{n+1} \frac{(x_i + x_{i-1})}{2} (d_i - d_{i-1})}{17.5} . \quad (5)$$

If the area-under-the-curve estimate was less than the peak survey, the peak survey was used as the total escapement estimate. If both aerial and ground surveys were available, the survey providing the largest number was used as the total escapement estimate. Exceptions are noted in the results section.

Unlike pink and chum salmon, sockeye salmon tend to gather in lakes and are often still alive after the last spawning surveys are completed. For this species, peak counts were used as an escapement index unless noted otherwise.

## RESULTS

A total of 233,834 sockeye, 4,367 chum, and 866,774 pink salmon were harvested in Lower Cook Inlet in 1993 (Tables 1, 2, and 3). Total escapements were estimated to be 55,056 sockeye,

774,286 pink and 99,888 chum salmon. Most escapement estimates were obtained from aerial surveys (Tables 4, 5, and 6).

Sockeye salmon catch samples were collected in the Southern and Kamishak Bay Districts and escapement samples were collected in the Southern, Outer, Eastern and Kamishak Bay Districts. Harvests from sampled sockeye salmon runs represented 84% of the total sockeye salmon catch. The remaining sockeye catch was not sampled because either runs were small or catches were of mixed stocks. All chum salmon escapement samples were obtained from carcasses. The harvest of only one stock, representing 8% of the total chum salmon harvest, was sampled.

Harvests from 10 commercial fisheries were sampled during the period 10 June through 17 August (Table 7). A total of 4,239 readable scales and 425 readable otoliths were collected. (Table 8). The sample size of all but one of the scale samples taken met or exceeded requirements for the 95% confidence level where  $d = 0.05$ . None of the otolith sample sizes obtained met requirements for the 95% confidence level where  $d = 0.05$ .

### *Southern District Sockeye Salmon*

China Poot Bay was the only fishery targeting a discrete stock of salmon in the Southern District. The run to China Poot Bay was composed of sockeye salmon returning to Leisure Lake, which supported the largest sockeye salmon fishery in Lower Cook Inlet in 1993. This run is the result of an ongoing lake stocking program that began in 1976. Within China Poot Bay, the commercial fishery harvested 67,688 sockeye salmon while the hatchery cost recovery fishery harvest 5,258 sockeye salmon. Overall mean weight of harvested sockeye salmon based on fish ticket information was 1.88 kg. Sockeye salmon within commercial catch samples had a mean weight of 1.61 kg, were 85.60% age 1.2, and 62.29% female (Table 9). The total sport catch was estimated to be 400 sockeye salmon and the personal use catch was estimated to be 4,000 sockeye salmon (McNair and Holland 1993). Because a barrier falls prevents upstream spawning migration, attempted are made to harvest sockeye salmon returning to the terminal area. In 1993 only 424 sockeye salmon were not harvested.

Adjacent to China Poot Bay other purse seine fisheries had mixed stock sockeye salmon catches which totaled 12,086 in Halibut Cove (mean weight, 2.05 kg), 3,271 in Halibut Cove Lagoon (mean weight, 1.85 kg), 51,572 in Neptune Bay (1.92 kg), and 1,737 in Tutka/Kasitsna Bay (mean weight, 1.97 kg). The mixed stock harvest in Neptune Bay may include returns from a hatchery release into Hazel Lake. Sockeye salmon in Neptune Bay commercial catch samples had a mean length of 487 mm, mean weight of 1.73 kg, were 92.30% age 1.2, and 48.20% females (Table 10).

Set gillnet fisheries also had mixed stock sockeye salmon harvests which totaled 3,677 in Halibut Cove (mean weight, 2.29 kg), 2,619 near Barabara Creek (mean weight, 2.57 kg), 4,060 in

Kasitsna Bay (mean weight, 2.48 kg), and 4,435 in Seldovia Bay (mean weight, 2.47 kg). Sockeye caught in set gillnet fisheries may be destined for Upper Cook Inlet because their mean weights are larger than those reported from China Poot Bay and adjacent areas.

The only sizable run of sockeye salmon in the Southern District occurs in the English Bay River drainage where 8,939 sockeye salmon were passed through the weir (Mark Scholenberger, North Pacific Rim, personal communications). Females accounted for 55.62% of the escapement sampled between 2 June and 9 July. Age-1.3 sockeye salmon represented 73.07% of the samples. English Bay sockeye salmon had a mean length of 554 mm and a mean weight of 2.65 kg (Table 11). No commercial fishing was allowed on English Bay stocks during 1993.

### *Outer District Sockeye Salmon*

Wild sockeye salmon runs in Nuka Bay have increased in abundance, and a commercial fishery was allowed to harvest 3,519 sockeye salmon. Sockeye salmon in catch samples had a mean length of 543 mm, a mean weight of 2.37 kg, were 40.98% age 2.3, 26.95% age 1.3, and 50.20% females (Table 12). Otoliths were obtained from 67 sockeye salmon spawning in Delight Lake, which had an estimated total escapement of 5,000, on 26 August. Sockeye salmon in escapement samples were smaller and younger than those in catch samples, having a mean length of 515 mm, a mean weight of 2.13 kg, and being 41.8% age 1.2, and 38.82% age 2.2 (Tables 13). Otoliths were sampled from 23 carcasses in Ecstasy Lake, which had an estimated total escapement of 1,300, on 22 and 27 August. Sockeye salmon in escapement samples from this lake were also smaller and younger than those in catch samples, having a mean length of 516 mm and being 47.85% age 1.2 and 39.15% age 2.2 (Table 14). The low proportion of age-.3 sockeye salmon in Delight and Ecstasy Lake suggested that the commercial fishery may have targeted on Desire Lake stocks. Unfortunately, Desire Lake escapement samples were not collected.

### *Eastern District Sockeye Salmon*

Wild sockeye salmon runs into Aialik Bay were weak this year. The commercial fishery only harvested 170 sockeye salmon, while total escapement was 3,000 sockeye salmon. Otoliths were taken from 159 carcasses in the escapement. Age-1.2 sockeye salmon represented 58.49% of the sample, while age-1.3 and -2.2 each represented 18.24% of the sample (Table 15).

### *Kamishak Bay District Sockeye Salmon*

Three sockeye salmon stocks were sampled in the Kamishak Bay District in 1993. The Kirschner Lake run, maintained by stocking a lake inaccessible to anadromous salmonids, produced a commercial harvest of 39,648 sockeye salmon with no escapement. Chenik Lake Subdistrict had a commercial harvest of 24,567 sockeye salmon and an escapement of 4,000 sockeye salmon above the Chenik Lake weir. McNeil Cove had a catch of 941 sockeye salmon and an escapement of 6,350 sockeye salmon into Mikfik Creek. The commercial harvest of 1,251 sockeye salmon reported from the Douglas River Subdistrict were probably part of the run bound for Big Kamishak River, which is the only nearby drainage capable of supporting a catch of this size. Escapement into Big Kamishak River, a peak count rather than a total escapement estimate, was 4,030 sockeye salmon.

A catch sample from the Kirschner Lake run was obtained on 27 July. The mean weight of sockeye salmon in the sample was 1.56 kg, and females comprised 62.31% of the sample (Table 16). Age-2.3 sockeye salmon returning in 1993 migrated from the system as age-2 smolt in 1990, which had originally been stocked as age-0 fry in 1988. Age-1.3 and -2.2 sockeye salmon returning in 1993 were from the third stocking of age-0 fry in 1989, while age-1.2 and -2.1 sockeye salmon were from the 1990 stocking, and the age-1.1 and -0.2 sockeye salmon were from the 1991 stocking.

Chenik Lake's natural run was supplemented with hatchery-reared sockeye salmon juveniles since 1978. A catch sample from the Chenik Lake run was obtained on 1 July, and escapement samples were obtained from the Chenik Lake weir between 25 June and 23 July. Age-1.2 and -1.3 sockeye salmon were the dominant age groups in both catch and escapement samples (Tables 17 and 18). Females comprised a lesser percentage of the catch sample, 43.95%, than the escapement sample, 56.92%. This was reflected in a slightly greater mean length of sockeye salmon from the catch sample, 539 mm, than from the escapement sample, 532 mm, since the average size of males were greater larger than that of females.

A catch sample from the Mikfik run was obtained on 10 June. Age-1.2 and -1.3 sockeye salmon dominated the sample. Mean length of sockeye salmon in the sample was 486 mm, mean weight was 1.44 kg, and the percentage of females was 52.33 (Table 19).

A catch sample from the Douglas River harvest was obtained on 25 June. Age-1.2 and -1.3 sockeye salmon also dominated this sample. Mean length of sockeye salmon in the sample was 540 mm, and the percentage of females 42.75 (Table 20).

## *Kamishak Bay District Chum Salmon*

The McNeil River chum salmon run in the Kamishak Bay District was weak in 1993. The commercial harvest was limited to 374 chum salmon and the resulting escapement was 17,430 chum salmon. Otoliths samples were obtained only from the latter portion of the escapement, and only age-0.3 and -0.4 chum salmon were present (Table 21). We do not know whether older chum salmon were absent from the run or whether they were present in the earlier portion of the run which was not sampled.

## DISCUSSION

We feel more confident in the ages based on scales rather than those based on otoliths since we have more experience in scale interpretation and otolith samples were generally small. We are particularly concerned with the small sample, 23 sockeye salmon, obtained from Ecstasy Lake. If ages appear to be missing in brood tables for this system, this otolith sample could be reinterpreted. However, some of the otoliths were soaked in a glycerine solution for more than a day which made them translucent. These otoliths may be very difficult to age again.

Data from this report were added to existing Lower Cook Inlet data files containing mean length, weight, and age composition by brood year and age group (Appendices A.1-A.6). This information is used to examine brood year production as well as to set biological escapement goals. These files reflect revisions and corrections made to data contained in earlier reports and, thus, supersede previously reported information.

Examination of mean length and weight information sometimes provides clues to errors contained in the data, since we expect both mean length and weight to increase with ocean age for salmon within the same brood year. In instances where this trend did not occur, which are rare, data have been examined for key punch errors and scales have been aged again. For example, female Aialik sockeye salmon produced from 1978 brood year spawning had mean lengths that decreased from 558 mm at age 1.3 to 547 mm at age 1.4. This suggests that some of these females may have been incorrectly aged. Unfortunately, we have not been able to find original data forms, scale cards, or scale impressions to verify these data. This instance emphasizes the importance of archiving original data, including scales and otoliths, so that they are easily retrievable.

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Table 1. Commercial catch and escapement of sockeye salmon in numbers of fish by subdistrict, Lower Cook Inlet, 1993.

FISHERY	CATCH	ESCAPEMENT <sup>a</sup>	TOTAL RUN
SOUTHERN DISTRICT			
Humpy Creek	271	24	295
Halibut Cove Subdistrict	15,763		15,763
Halibut Cove Lagoon	3,271		3,271
China Poot Bay	67,688	425 <sup>b</sup>	68,113
Neptune Bay	59,895		59,895
Tutka/Kasitsna Bays	5,805		5,805
Seldovia Bay	4,435	4	4,439
Barabara Creek	2,616		2,619
English Bay		8,936	8,936
DISTRICT TOTAL	159,747	9,396	169,136
OUTER DISTRICT			
Port Chatham	7	1	8
Chugach Bay	11	11	11
Windy Bay	17	1	18
Port Dick	1,010	25	1,035
Nuka Island	49		49
East Arm Nuka Bay	3,519		
James Lagoon		1	
Desire Lake		10,960	
Delight Lake		5,000	
Ecstasy Lake		1,300	
Total Run			21,380
DISTRICT TOTAL	4,613	17,888	22,501
EASTERN DISTRICT			
Aialik Bay	170	3,000	3,170
Resurrection Bay North	1,653		
Bear Creek		5,033	
Salmon Creek		115	
Clear Creek		2	
Total Run			6,803
Renard Island	1		1
DISTRICT TOTAL	1,824	8,150	9,974

-continued-

Table 1 (page 2 of 2)

FISHERY	CATCH	ESCAPEMENT <sup>a</sup>	TOTAL RUN
KAMISHAK DISTRICT			
Iniskin Bay			
Iniskin River		30	
North Head Creek		20	
Total Run			50
Ursus Cove			
Brown Peak Creek		100	
Ursus Lagoon		10	
Total Run			110
Kirschner Lake	39,648		39,648
Bruin Bay	1,243		
Bruin Lake Creek		1,500 <sup>b</sup>	
Bruin Bay		800	
Total Run			3,543
Chenik Lake	24,567		
Amakdedori Creek		1,950	
Chenik Creek		4,000 <sup>c</sup>	
Total Run			30,517
Paint River		800 <sup>b</sup>	800
McNeil River	941		
Mikfik Creek		6,350	
McNeil River		4	
Total Run			7,295
Kamishak River			
Little Kamishak River		25	
Strike Creek		10	
Big Kamishak River		4,030	
Total Run			4,065
Douglas River/Silver Beach	1,251		1,251
DISTRICT TOTAL	67,650	19,629	87,279
TOTAL LOWER COOK INLET			
	233,834	55,056	288,890

<sup>a</sup> see Table 4 for summary of methods.

<sup>b</sup> Fish did not spawn because of barrier falls.

<sup>c</sup> Fish did not spawn because ladder was not open during 1993.

Table 2. Commercial catch and escapement of chum salmon in numbers of fish by subdistrict, Lower Cook Inlet, 1993.

FISHERY	CATCH	ESCAPEMENT <sup>a</sup>	TOTAL RUN
SOUTHERN DISTRICT			
Humpy Creek		336	336
Halibut Cove Subdistrict	35		35
Halibut Cove Lagoon	3		3
China Poot Bay	47		47
Neptune Bay	38		38
Tutka Bay	861	30	891
Barabara	571		571
Seldovia Bay	1,233	1,623	2,856
Port Graham			
Port Graham River		2,450	
Port Graham Left		19	
Total Run			2,469
DISTRICT TOTAL	2,788	4,458	7,246
OUTER DISTRICT			
Dogfish Bay		5,374	5,374
Port Chatham	88	441	529
Chugach Bay	6		6
Windy Bay	133		
Windy River Left		305	
Windy River Right		385	
Total Run			823
Rocky Bay		50	50
Port Dick	724		
Port Dick-Head End Creek		2,548	
Port Dick-Slide Creek		96	
Port Dick-Middle Creek		204	
Port Dick-Island Creek		3,619	
Total Run			7,191
Nuka Island	6		
South Nuka Island Creek		1	
Petrof River		300	
Total Run			307
East Arm Nuka (James Lagoon)	13	628	641
DISTRICT TOTAL	970	13,951	14,921

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Table 2 (page 2 of 2)

FISHERY	CATCH	ESCAPEMENT <sup>a</sup>	TOTAL RUN
EASTERN DISTRICT			
Aialik Bay	9		9
Resurrection Bay North			
Clear Creek		31	
Sawmill Creek		54	
Spring Creek		120	
Tonsina Creek		1,591	
Thumb Cove		2	
Total Run			1,798
DISTRICT TOTAL	9	1,798	1,807
KAMISHAK DISTRICT			
Iniskin Bay			
Iniskin River		7,998	
Sugarloaf Creek		2,696	
North Head Creek		679	
Total Run			11,373
Cottonwood Bay		11,975	11,975
Ursus Cove			
Brown Peak Creek		1,453	
Ursus Lagoon		4,173	
Ursus Lagoon Righthand		3,568	
Total Run			9,194
Rocky Cove (Sunday Creek)		1,331	1,331
Kirschner Lake	126		126
Bruin Bay	3	5,999	6,002
Chenik Lake	68		68
McNeil River	374	17,430	17,804
Kamishak River/Douglas Reef			
Little Kamishak River		6,311	
Strike Creek		1,111	
Big Kamishak River		9,111	
Total Run			16,533
Douglas River	29	5,846	5,875
DISTRICT TOTAL	600	79,681	80,281
TOTAL LOWER COOK INLET	4,367	99,888	104,255

<sup>a</sup> see Table 5 for summary of methods.

Table 3. Commercial catch and escapement of pink salmon in numbers of fish by subdistrict, Lower Cook Inlet, 1993.

FISHERY	CATCH	ESCAPEMENT <sup>a</sup>	TOTAL RUN
SOUTHERN DISTRICT			
Humpy Creek	223	35,973	36,196
Halibut Cove Subdistrict	25,494		25,494
Halibut Cove Lagoon	74,720		74,720
China Poot Bay	23,912	1,649	25,561
Neptune Bay	26,677		26,677
Tutka/Kasitsna Bays	537,778		
Tutka Creek		27,403	
Hatchery brood stock		110,000	
Total Run			672,423
Barabara	1,601	11,887	13,488
Seldovia Bay	2,389	43,401	45,790
Port Graham			
Hatchery brood stock		5,257	
Port Graham River		12,800	
Port Graham Left		7,422	
Total Run			25,479
DISTRICT TOTAL	692,794	253,034	945,828
OUTER DISTRICT			
Dogfish Bay		326	326
Port Chatham	14,672	22,221	36,893
Chugach Bay	8,801	9,351	18,152
Windy Bay	43,371		
Windy River Left		25,898	
Windy River Right		13,626	
Total Run			82,895
Rocky Bay			
Scurvey Creek		710	
Rocky River		69,950	
Total Run			70,660
Port Dick South Sect.	26,626		
Port Dick-Head End Creek		37,014	
Port Dick-Slide Creek		5,944	
Port Dick-Middle Creek		193	
Port Dick-Island Creek		12,059	
additional fish offshore		18,300	
Total Run			100,136
Nuka Island	51,890		
Nuka Island South Creek		34,340	
Berger Bay		229	
Mike's Bay		909	
Home Cove		686	
additional fish offshore		5,200	
Total Run			93,254
East Arm Nuka	13,799		
James Lagoon		3,298	
Desire Lake		19,329	
Ecstasy Lake		74	
Total Run			36,500
DISTRICT TOTAL	159,159	279,657	438,816

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Table 3 (page 2 of 2)

FISHERY	CATCH	ESCAPEMENT <sup>a</sup>	TOTAL RUN
EASTERN DISTRICT			
Aialik Bay	9,952		9,952
Resurrection Bay North			
Bear\Salmon Creeks		6,617	
Clear Creek		2,041	
Mayor Creek		1,587	
Sawmill Creek		517	
Spring Creek		589	
Tonsina Creek		3,187	
Thumb Cove		5,469	
Total Run			20,007
Renard Island (Humpy Cove)	664	923	1,587
DISTRICT TOTAL	10,616	20,930	31,546
KAMISHAK DISTRICT			
Iniskin Bay (North Head Creek)		33,307	33,307
Ursus Cove (Brown Peak Creek)		41,566	41,566
Rocky Cove (Sunday Creek)		57,750	57,750
Kirschner Lake	4,005		4,005
Bruin Bay	77	86,361	86,438
Chenik Lake (Amakdedori Creek)	110	1,681	1,791
McNeil Cove	9		9
Douglas River/Silver Beach	4		4
DISTRICT TOTAL	4,205	220,665	224,870
TOTAL LOWER COOK INLET	866,774	774,286	1,641,060

<sup>a</sup> see Table 6 for summary of methods.

Table 4. Survey method and total escapement algorithm for sockeye salmon streams in Lower Cook Inlet, 1993.

Stream	Survey Method	Total Escapement Algorithm
<b>SOUTHERN DISTRICT</b>		
Humpy Creek	ground	peak live count
China Poot Bay	ground	peak live count
Seldovia River	ground	peak live count
Barabara Creek	ground	peak live count
English Bay	weir	sum of daily weir counts
<b>OUTER DISTRICT</b>		
Port Chatham	ground	peak live count
Windy Creek Left	ground	peak live count
Port Dick Head End Creek	ground	peak live count
James Lagoon	ground	peak live count
Desire Lake	aerial	peak live count
Delight Lake	aerial	see footnote <sup>a</sup>
Ecstasy Lake	aerial	peak live count
<b>EASTERN DISTRICT</b>		
Aialik Lake	aerial	peak live count
Salmon Creek	ground	peak live count
Bear Creek	weir	sum of daily weir counts
Clear Creek	ground	peak live count
<b>KAMISHAK BAY DISTRICT</b>		
Iniskin River	aerial	peak live count
North Head Creek	aerial	peak live count
Brown Peak Creek	aerial	peak live count
Ursus Lagoon	aerial	peak live count
Bruin Lake Creek	aerial	peak live count
Bruin Bay	aerial	peak live count
Amakdedori Creek	aerial	peak live count
Chenik Lake	weir	sum of daily weir counts
Paint River	aerial	peak live count
McNeil River	aerial	peak live count
Mikfik Creek	aerial	see footnote <sup>b</sup>
Little Kamishak River	aerial	peak live count
Strike Creek	aerial	peak live count
Big Kamishak River	aerial	peak live count

<sup>a</sup> Peak count of 5,000 observed in lake on 12 July. Another 2,200 observed stranded in lagoon on 23 July. The 2,200 entered the lake when rains raised water level in stream.

<sup>b</sup> Aerial surveyors believed that salmon observed after 7 July were new fish. Therefore, a total escapement of 6,350 was obtained from the peak survey of 3,650 on 18 June plus 2,700 new fish on 13 July.



Table 5. Survey method and total escapement algorithm for chum salmon streams in Lower Cook Inlet, 1993.

Stream	Survey Method	Total Escapement Algorithm
<b>SOUTHERN DISTRICT</b>		
Humpy Creek	ground	17.5-d stream life, assume no salmon after 15 September
Tutka Lagoon Creek	ground	17.5-d stream life, assume no salmon after 5 September
Seldovia River	ground	17.5-d stream life, assume no salmon after 5 September
Port Graham Left	ground	17.5-d stream life, assume no salmon after 5 September
Port Graham River	ground	17.5-d stream life, assume no salmon after 15 September
<b>OUTER DISTRICT</b>		
Dogfish Creek	ground	17.5-d stream life, assume no salmon after 5 September
Port Chatham	ground	17.5-d stream life, assume no salmon after 5 September
Windy Creek Left	ground	17.5-d stream life, assume no salmon after 15 September
Windy Creek Right	ground	17.5-d stream life, assume no salmon after 15 September
Rocky River	aerial	peak live count
Port Dick Head End Creek	ground	17.5-d stream life, assume no salmon after 15 September
Port Dick Slide Creek	ground	17.5-d stream life, assume no salmon after 15 September
Port Dick Middle Creek	aerial	17.5-d stream life, assume no salmon after 5 September
Port Dick Island Creek	ground	17.5-d stream life, assume no salmon after 15 September
Petrof River	aerial	peak live count
South Nuka Island	ground	peak live count
James Lagoon	ground	17.5-d stream life, assume no salmon after 5 September
<b>EASTERN DISTRICT</b>		
Tonsina Creek (Seward)	ground	17.5-d stream life, assume no salmon after 15 September
Clear Creek	ground	17.5-d stream life, assume no salmon after 15 September
Sawmill Creek	ground	17.5-d stream life, assume no salmon after 15 September
Spring Creek	ground	17.5-d stream life, assume no salmon after 15 September
Thumb Cove	ground	peak live count
<b>KAMISHAK BAY DISTRICT</b>		
Iniskin River	aerial	17.5-d stream life, assume no salmon after 15 September
Sugarloaf Creek	aerial	17.5-d stream life, assume no salmon after 15 September
North Head Creek	aerial	17.5-d stream life, assume no salmon after 5 September
Cottonwood Creek	aerial	17.5-d stream life, assume no salmon after 15 September
Brown's Peak Creek	aerial	17.5-d stream life, assume no salmon after 5 September
Ursus Lagoon Righthand	aerial	17.5-d stream life, assume no salmon after 15 September
Ursus Lagoon	aerial	17.5-d stream life, assume no salmon after 15 September
Sunday Creek	aerial	17.5-d stream life, assume no salmon after 15 September
Bruin Bay	aerial	17.5-d stream life, assume no salmon after 5 September
McNeil River	aerial	17.5-d stream life, assume no salmon after 5 September*
Little Kamishak River	aerial	17.5-d stream life, assume no salmon after 5 September
Strike Creek	aerial	17.5-d stream life, assume no salmon after 5 September
Big Kamishak River	aerial	17.5-d stream life, assume no salmon after 5 September
Douglas Beach Creek	aerial	17.5-d stream life, assume no salmon after 5 September

\* McNeil River chum salmon aerial surveys are only considered as indices; the estimated number of salmon consumed by bears in the McNeil River Wildlife Sanctuary has at times exceeded the peak number of salmon estimated from aerial surveys.

Table 6. Survey method and total escapement algorithm for pink salmon streams in Lower Cook Inlet, 1993.

Stream	Survey Method	Total Escapement Algorithm
<b>SOUTHERN DISTRICT</b>		
Humpy Creek	ground	17.5-d stream life, assume no salmon after 15 September
China Poot Creek	ground	peak live + carcass count
Tutka Lagoon Creek	ground	17.5-d stream life, assume no salmon after 15 September
Seldovia River	ground	17.5-d stream life, assume no salmon after 15 September
Barabara Creek	ground	17.5-d stream life, assume no salmon after 15 September
Port Graham Left	ground	17.5-d stream life, assume no salmon after 15 September
Port Graham River	ground	17.5-d stream life, assume no salmon after 15 September
<b>OUTER DISTRICT</b>		
Dogfish Bay	ground	17.5-d stream life, assume no salmon after 15 September
Port Chatham	ground	17.5-d stream life, assume no salmon after 15 September
Chugach Bay	aerial	17.5-d stream life, assume no salmon after 15 September
Windy Creek Left	ground	17.5-d stream life, assume no salmon after 15 September
Windy Creek Right	aerial	17.5-d stream life, assume no salmon after 15 September <sup>a</sup>
Scurvey Creek	aerial	peak live count
Rocky River	aerial	17.5-d stream life, assume no salmon after 31 August
Port Dick Head End Creek	aerial	17.5-d stream life, assume no salmon after 20 September <sup>b</sup>
Port Dick Slide Creek	ground	peak live + carcass count
Port Dick Middle Creek	aerial	17.5-d stream life, assume no salmon after 20 September
Port Dick Island Creek	aerial	17.5-d stream life, assume no salmon after 20 September <sup>c</sup>
South Nuka Island Creek	aerial	17.5-d stream life, assume no salmon after 15 September
Berger Bay	aerial	17.5-d stream life, assume no salmon after 15 September <sup>d</sup>
Mike's Bay	aerial	17.5-d stream life, assume no salmon after 15 September <sup>e</sup>
Home Cove	aerial	17.5-d stream life, assume no salmon after 15 September <sup>f</sup>
James Lagoon	ground	17.5-d stream life, assume no salmon after 15 September
Desire Lake	aerial	17.5-d stream life, assume no salmon after 15 September
Ecstasy Lake	aerial	17.5-d stream life, assume no salmon after 15 September
<b>EASTERN DISTRICT</b>		
Humpy Cove	ground	peak live + carcass count
Tonsina Creek	ground	peak live + carcass count
Bear Creek	ground	peak live + carcass count
Clear Creek	ground	peak live + carcass count
Mayor Creek	ground	peak live + carcass count
Sawmill Creek	ground	peak live + carcass count
Spring Creek	ground	peak live + carcass count
Thumb Cove	ground	peak live + carcass count
<b>KAMISHAK BAY DISTRICT</b>		
North Head Creek	aerial	17.5-d stream life, assume no salmon after 15 September
Brown's Peak Creek	aerial	17.5-d stream life, assume no salmon after 15 September
Sunday Creek	aerial	17.5-d stream life, assume no salmon after 15 September
Bruin Bay	aerial	17.5-d stream life, assume no salmon after 15 September
Amakdedori Creek	aerial	17.5-d stream life, assume no salmon after 15 September

<sup>a</sup> Pink salmon ground surveys in Windy Creek Right may have missed peak on 26 September. Therefore, the aerial survey estimate was used.

<sup>b</sup> Plus 7,000 fish in bay at end of survey season.

<sup>c</sup> Plus 11,300 fish in bay at end of survey season.

<sup>d</sup> Plus 600 fish in bay at end of survey season.

<sup>e</sup> Plus 2,100 fish in bay at end of survey season.

<sup>f</sup> Plus 2,500 fish in bay at end of survey season.

Table 7. Daily catch of sockeye and chum salmon in 10 Lower Cook Inlet fisheries, 1993.

Date	Sockeye									Chum
	China Poot Bay	Nuka Bay	Aialik	Neptune Bay	Douglas River	MikFik	Chenik/ Paint	Bruin Bay	Kirschner	McNeil
6 10						574				
6 11						344				6
6 24					971					
6 25	13				153	15				55
6 28	856									
6 29	1,244				3					
6 30	407						4,670			
7 1	469									
7 2	1,406			72						
7 4	1,053									
7 5	3,068			450			2,619			
7 6	1,738			980	124	0	1,613			49
7 7	1,779	588		1,340			2,694			
7 8	3,045	141		736			1,100	650		
7 9	1,646			1,507		8	3,449	99		189
7 10	2,851			216		0			3,326	75
7 12	9,666	245		7,315			2,019		1,998	
7 13	4,948	321		7,229			4,064		1,326	
7 14	6,462	306		5,574					1,650	
7 15	7,229	134		3,861						
7 16	4,245	148		2,550			2,339		10,092	
7 17	1,497			8,502						
7 19	3,567	47		9,571						
7 20	2,300	167		2,115					9,960	
7 21	2,046	258		3,132						
7 22	1,686	146		818					373	
7 23	1,252			165					3,717	
7 24	431							494	1,646	
7 26	225	41		1,383					1,555	
7 27	586	16		374					1,679	
7 28	843			394						
7 29	487			536						
7 30	336			235					1,000	
7 31	238									
8 2	69	117		560						
8 3				82						
8 4		58								
8 5		93		198						
8 6		45								
8 9		141							1,326	
8 10		149	13							
8 11		306								
8 12			59							
8 13		52	12							
8 14			47							
8 15										
8 16			38							
8 17			1							
total	67,688	3,519	170	59,895	1,251	941	24,567	1,243	39,648	374

Table 8. Sample sizes of readable salmon scales, otoliths, and corresponding confidence levels for age composition in Lower Cook Inlet, 1993.

Species	Fishery (Subdistrict)	Sample			Confidence Interval <sup>a</sup>
		Dates	Size	Type	
Sockeye	China Poot Bay	20 July	236	scale	0.967
	Neptune Bay	11 July	479	scale	0.999
	English Bay	2 June - 25 June	385	scale	0.988
		26 June- 9 July	406	scale	0.931
		combined	791		0.931
	Nuka Bay	7 July	508	scale	0.962
	Delight Lake	26 August	67	otolith	0.000, 0.793 if $d = 0.10$
	Ecstasy Lake	22-27 August	23	otolith	0.000, 0.231 if $d = 0.10$
	Aialik	21 September	159	otolith	0.593, 0.987 if $d = 0.10$
	Kirschner Lake	27 July	520	scale	0.999
	Chenik	1 July	537	scale	0.999
	Chenik Lake	25 June-23 July	564	scale	0.997
	Mikfik <sup>b</sup>	10 June	487	scale	0.949
	Silver Beach <sup>c</sup>	25 June	117	scale	0.445
Chum	McNeil	14-28 August	176	otolith	0.849, 0.999 if $d = 0.10$

<sup>a</sup> Simultaneous confidence interval of multiple age classes (Thompson 1987) where  $d = 0.05$ .

<sup>b</sup> McNeil River Subdistrict

<sup>c</sup> Douglas River Subdistrict

Table 9. Age, sex, and size composition of sockeye salmon commercial catch from China Poot Subdistrict, 1993.

	Age Group					
	1.1	1.2	2.1	1.3	2.2	total
Sample Period : 20 July						
Males	287	19,789	287	2,295	2,868	25,526
Percent	0.42	29.24	0.42	3.39	4.24	37.71
Sample Size	1	69	1	8	10	89
Mean Length	761	494	394	540	517	503
Std. Error		2		7	4	1
Sample Size	1	69	1	8	10	89
Mean Weight		1.57			2.17	1.65
Std. Error		0.12				0.11
Sample Size		6			1	7
Females		38,146		2,008	2,008	42,162
Percent		56.36		2.97	2.97	62.29
Sample Size		133		7	7	147
Mean Length		495		538	521	498
Std. Error		1		12	6	1
Sample Size		133		7	7	147
Mean Weight		1.54		2.51		1.59
Std. Error		0.06				0.06
Sample Size		14		1		15
Both Sexes	287	57,935	287	4,303	4,876	67,688
Percent	0.42	85.59	0.42	6.36	7.20	100.00
Sample Size	1	202	1	15	17	236
Mean Length	761	494	394	539	519	500
Std. Error		1		6	3	1
Sample Size	1	202	1	15	17	236
Mean Weight		1.55		2.51	2.17	1.61
Std. Error		0.06				0.05
Sample Size		20		1	1	22

Table 10. Age, sex, and size composition of sockeye salmon escapement in Neptune Bay, 1993.

	Age Group				
	1.2	1.3	2.2	2.3	total
Sample Period : 11 July					
Males	29,260	1,000	750		31,010
Percent	48.85	1.67	1.25		51.77
Sample Size	234	8	6		248
Mean Length	484	528	500		486
Std. Error	1	7	6		1
Sample Size	234	8	6		248
Mean Weight	1.79	2.40			1.81
Std. Error	0.06	0.20			0.06
Sample Size	19	2			21
Females	26,010	1,375	1,250	250	28,885
Percent	43.43	2.30	2.09	0.42	48.23
Sample Size	208	11	10	2	231
Mean Length	483	540	504	507	487
Std. Error	1	6	6	10	1
Sample Size	208	11	10	2	231
Mean Weight	1.61	2.30		1.89	1.65
Std. Error	0.06				0.05
Sample Size	16	1		1	18
Both Sexes	55,270	2,375	2,000	250	59,895
Percent	92.28	3.97	3.34	0.42	100.00
Sample Size	442	19	16	2	479
Mean Length	484	535	502	507	487
Std. Error	0	5	4	10	0
Sample Size	442	19	16	2	479
Mean Weight	1.71	2.34		1.89	1.73
Std. Error	0.04	0.20			0.04
Sample Size	35	3		1	39

Table 11. Age, sex, and size composition of sockeye salmon escapement in English Bay River weir, 1993.

	Age Group					
	0.3	1.2	1.3	2.2	2.3	total
Sample Period 1: 2 June - 25 June						
Males	7	7	1,042	35	124	1,215
Percent	0.26	0.26	39.22	1.32	4.67	45.73
Sample Size	1	1	151	5	18	176
Mean Length	570	570	578	570	568	577
Std. Error			1	5	5	1
Sample Size	1	1	151	5	18	176
Mean Weight	2.90	2.60	2.99	2.74	2.88	2.97
Std. Error			0.03	0.08	0.06	0.02
Sample Size	1	1	151	5	18	176
Females	7	28	1,172	21	214	1,442
Percent	0.26	1.05	44.11	0.79	8.05	54.27
Sample Size	1	4	170	3	31	209
Mean Length	580	517	553	560	545	551
Std. Error		14	1	11	3	1
Sample Size	1	4	170	3	31	209
Mean Weight	2.90	2.13	2.58	2.60	2.54	2.57
Std. Error		0.15	0.02	0.06	0.04	0.02
Sample Size	1	4	170	3	31	209
Both Sexes	14	35	2,214	56	338	2,657
Percent	0.53	1.32	83.33	2.11	12.72	100.00
Sample Size	2	5	321	8	49	385
Mean Length	575	528	564	566	554	563
Std. Error		14	1	5	2	1
Sample Size	2	5	321	8	49	385
Mean Weight	2.90	2.22	2.77	2.69	2.66	2.75
Std. Error		0.15	0.02	0.05	0.03	0.02
Sample Size	2	5	321	8	49	385

-Continue-

Table 11. (page 2 of 3)

	Age Group					
	0.3	1.2	1.3	2.2	2.3	total
Sample Period 2: 26 June - 9 July						
Males		93	1,733	46	836	2,708
Percent		1.48	27.59	0.73	13.31	43.11
Sample Size		6	112	3	54	175
Mean Length		498	563	550	563	561
Std. Error		6	2	11	3	1
Sample Size		6	112	3	54	175
Mean Weight		2.25	2.87	2.73	2.84	2.84
Std. Error		0.20	0.03	0.18	0.04	0.02
Sample Size		6	112	3	54	175
Females	15	217	2,244	108	990	3,574
Percent	0.24	3.45	35.72	1.72	15.76	56.89
Sample Size	1	14	145	7	64	231
Mean Length	550	481	537	492	537	532
Std. Error		5	1	7	2	1
Sample Size	1	14	145	7	64	231
Mean Weight	3.20	1.79	2.42	1.83	2.44	2.37
Std. Error		0.09	0.02	0.09	0.03	0.02
Sample Size	1	14	145	7	64	231
Both Sexes	15	310	3,977	154	1,826	6,282
Percent	0.24	4.93	63.31	2.45	29.07	100.00
Sample Size	1	20	257	10	118	406
Mean Length	550	486	548	509	549	544
Std. Error		4	1	6	1	1
Sample Size	1	20	257	10	118	406
Mean Weight	3.20	1.93	2.62	2.10	2.62	2.57
Std. Error		0.09	0.02	0.08	0.02	0.01
Sample Size	1	20	257	10	118	406

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Table 11. (page 3 of 3)

	Age Group					
	0.3	1.2	1.3	2.2	2.3	total
all periods combined:						
Males	7	100	2,775	81	960	3,923
Percent	0.08	1.12	31.04	0.91	10.74	43.89
Sample Size	1	7	263	8	72	351
Mean Length	570	503	569	558	563	566
Std. Error		6	1	6	2	1
Sample Size	1	7	263	8	72	351
Mean Weight	2.90	2.27	2.92	2.73	2.85	2.88
Std. Error		0.20	0.02	0.11	0.03	0.02
Sample Size	1	7	263	8	72	351
Females	22	245	3,416	129	1,204	5,016
Percent	0.25	2.74	38.21	1.44	13.47	56.11
Sample Size	2	18	315	10	95	440
Mean Length	559	485	542	503	538	538
Std. Error		5	1	6	2	1
Sample Size	2	18	315	10	95	440
Mean Weight	3.10	1.83	2.47	1.96	2.46	2.43
Std. Error		0.08	0.02	0.08	0.03	0.01
Sample Size	2	18	315	10	95	440
Both Sexes	29	345	6,191	210	2,164	8,939
Percent	0.32	3.86	69.26	2.35	24.21	100.00
Sample Size	3	25	578	18	167	791
Mean Length	562	490	554	524	549	550
Std. Error		4	0	4	1	0
Sample Size	3	25	578	18	167	791
Mean Weight	3.06	1.96	2.67	2.26	2.63	2.63
Std. Error		0.08	0.01	0.06	0.02	0.01
Sample Size	3	25	578	18	167	791

Table 12. Age, sex, and size composition of sockeye salmon commercial catch from Nuka Bay, 1993.

	Age Group						total
	0.2	0.3	1.2	1.3	2.2	2.3	
Sample Period : 7 July							
Males		28	353	478	166	728	1,753
Percent		0.80	10.03	13.58	4.72	20.69	49.82
Sample Size		4	51	69	24	105	253
Mean Length		579	514	566	519	568	552
Std. Error		10	2	2	2	2	1
Sample Size		4	51	69	24	105	253
Mean Weight			2.07	2.76	1.85	2.72	2.51
Std. Error			0.10	0.09		0.10	0.06
Sample Size			8	7	1	10	26
Females			367	471	208	713	1,766
Percent	0.20		10.43	13.38	5.91	20.26	50.18
Sample Size	1		53	68	30	103	255
Mean Length	488		491	555	504	550	533
Std. Error			2	2	3	1	1
Sample Size	1		53	68	30	103	255
Mean Weight			1.83	2.32	2.19	2.38	2.23
Std. Error			0.04	0.11		0.09	0.05
Sample Size			2	9	1	14	26
Both Sexes	7	28	720	949	374	1,441	3,519
Percent	0.20	0.80	20.46	26.97	10.63	40.95	100.00
Sample Size	1	4	104	137	54	208	508
Mean Length	488	579	502	561	511	559	543
Std. Error		10	1	1	2	1	0
Sample Size	1	4	104	137	54	208	508
Mean Weight			1.95	2.54	2.04	2.55	2.37
Std. Error			0.05	0.07		0.07	0.04
Sample Size			10	16	2	24	52

Table 13. Age, sex, and size composition of sockeye salmon escapement in Delight Lake, 1993.

	Age Group				
	1.2	1.3	2.2	2.3	total
Sample Period : 26 August					
Males	1,045	597	1,119	299	3,060
Percent	20.90	11.94	22.38	5.98	61.20
Sample Size	14	8	15	4	41
Mean Length	501	570	517	572	527
Std. Error	4	5	8	12	3
Sample Size	14	8	15	4	41
Mean Weight	2.01	3.28	2.38	2.90	2.48
Std. Error	0.07	0.10	0.13	0.20	0.06
Sample Size	14	8	15	4	41
Females	1,045	149	522	224	1,940
Percent	20.90	2.98	10.44	4.48	38.80
Sample Size	14	2	7	3	26
Mean Length	483	556	495	526	497
Std. Error	5	14	6	6	3
Sample Size	14	2	7	3	26
Mean Weight	1.50	2.20	1.46	1.87	1.59
Std. Error	0.11	0.30	0.06	0.14	0.07
Sample Size	14	2	7	3	26
Both Sexes	2,090	746	1,641	523	5,000
Percent	41.80	14.92	32.82	10.46	100.00
Sample Size	28	10	22	7	67
Mean Length	492	567	510	552	515
Std. Error	3	5	6	7	2
Sample Size	28	10	22	7	67
Mean Weight	1.75	3.06	2.09	2.46	2.13
Std. Error	0.06	0.10	0.09	0.13	0.04
Sample Size	28	10	22	7	67

Table 14. Age, sex, and size composition salmon escapement in Ecstasy Lake<sup>a</sup>, 1993.

	Age Group				
	1.1	1.2	1.3	2.2	total
Sample Period : 22 August - 27 August					
Males	57	57	112	57	283
Percent	4.38	4.38	8.62	4.38	21.77
Sample Size	1	1	2	1	5
Mean Length	338	515	575	512	502
Std. Error			9		3
Sample Size	1	1	2	1	5
Mean Weight	0.50		2.95		2.12
Std. Error			0.05		0.03
Sample Size	1		2		3
Females		565		452	1,017
Percent		43.46		34.77	78.23
Sample Size		10		8	18
Mean Length		509		534	520
Std. Error		8		11	6
Sample Size		10		8	18
Mean Weight		1.63		1.76	1.69
Std. Error		0.10		0.10	0.07
Sample Size		8		4	12
Both Sexes	57	622	112	509	1,300
Percent	4.38	47.85	8.62	39.15	100.00
Sample Size	1	11	2	9	23
Mean Length	338	510	575	531	516
Std. Error		8	9	11	5
Sample Size	1	11	2	9	23
Mean Weight	0.50	1.63	2.95	1.76	1.75
Std. Error		0.10	0.05	0.10	0.06
Sample Size	1	8	2	4	15

<sup>a</sup> Unofficial name. Also called Delectable and Delusion Lake.

Table 15. Age of sockeye salmon escapement in Aialik Lake, 1993.

	Age Group					
	1.1	1.2	1.3	2.2	2.3	total
Sample Period: 21 September						
Both Sexes	38	1,755	547	547	113	3,000
Percent	1.26	58.49	18.24	18.24	3.77	100.00
Sample Size	2	93	29	29	6	159

Table 16. Age, sex, and size composition of sockeye salmon commercial catch from Kirschner Lake stock, Bruin Bay Subdistrict, 1993.

	Age Group							total
	0.2	1.1	1.2	2.1	1.3	2.2	2.3	
Sample Period : 27 July								
Males		305	13,038	839	229	457	76	14,944
Percent		0.77	32.88	2.12	0.58	1.15	0.19	37.69
Sample Size		4	171	11	3	6	1	196
Mean Length		351	475	390	520	475	527	469
Std. Error		22	1	1	11	11		1
Sample Size		4	171	11	3	6	1	196
Mean Weight			1.58		1.90	1.65		1.59
Std. Error			0.06			0.25		0.06
Sample Size			20		1	2		23
Females	76		23,180	76	457	686	229	24,704
Percent	0.19		58.46	0.19	1.15	1.73	0.58	62.31
Sample Size	1		304	1	6	9	3	324
Mean Length	484		476	394	524	483	529	477
Std. Error			1		10	7	6	0
Sample Size	1		304	1	5	8	3	322
Mean Weight			1.53		2.30			1.54
Std. Error			0.03					0.03
Sample Size			24		1			25
Both Sexes	76	305	36,218	915	686	1,143	305	39,648
Percent	0.19	0.77	91.35	2.31	1.73	2.88	0.77	100.00
Sample Size	1	4	475	12	9	15	4	520
Mean Length	484	351	476	390	523	480	528	474
Std. Error		22	0	1	7	6	6	0
Sample Size	1	4	475	12	8	14	4	518
Mean Weight			1.55		2.17	1.65		1.56
Std. Error			0.03			0.25		0.03
Sample Size			44		2	2		48

Table 17. Age, sex, and size composition of sockeye salmon commercial catch from Chenik Subdistrict, 1993.

	Age Group				
	1.2	2.1	1.3	2.2	total
Sample Period : 1 July					
Males	1,464	46	11,986	274	13,770
Percent	5.96	0.19	48.79	1.12	56.05
Sample Size	32	1	262	6	301
Mean Length	515	329	553	548	548
Std. Error	5		1	5	1
Sample Size	32	1	262	6	301
Mean Weight	1.37		2.11		2.03
Std. Error	0.20		0.06		0.06
Sample Size	3		24		27
Females	1,464		9,287	46	10,797
Percent	5.96		37.80	0.19	43.95
Sample Size	32		203	1	236
Mean Length	492		532	496	526
Std. Error	4		1		1
Sample Size	32		203	1	236
Mean Weight	1.40		1.78		1.73
Std. Error			0.05		0.04
Sample Size	1		25		26
Both Sexes	2,928	46	21,273	320	24,567
Percent	11.92	0.19	86.59	1.30	100.00
Sample Size	64	1	465	7	537
Mean Length	503	329	543	541	538
Std. Error	3		0	5	0
Sample Size	64	1	465	7	537
Mean Weight	1.39		1.97		1.90
Std. Error	0.20		0.04		0.04
Sample Size	4		49		53

Table 18. Age, sex, and size composition of sockeye salmon escapement at Chenik Lake weir, 1993.

	Age Group			
	1.1	1.2	1.3	total
Sample Period : 25 June - 23 July				
Males	7	326	1,390	1,723
Percent	0.17	8.15	34.75	43.08
Sample Size	1	46	196	243
Mean Length	340	496	557	544
Std. Error		2	1	1
Sample Size	1	46	196	243
Mean Weight		1.72	2.23	2.13
Std. Error		0.11	0.05	0.04
Sample Size		5	30	35
Females		348	1,929	2,277
Percent		8.70	48.23	56.92
Sample Size		49	272	321
Mean Length		480	528	521
Std. Error		3	1	1
Sample Size		49	272	321
Mean Weight		1.56	1.81	1.77
Std. Error		0.11	0.04	0.04
Sample Size		5	34	39
Both Sexes	7	674	3,319	4,000
Percent	0.17	16.85	82.97	100.00
Sample Size	1	95	468	564
Mean Length	340	488	540	531
Std. Error		2	0	0
Sample Size	1	95	468	564
Mean Weight		1.64	1.99	1.93
Std. Error		0.08	0.03	0.03
Sample Size		10	64	74



Table 19. Age, sex, and size composition of sockeye salmon commercial catch from Mikfik Creek, McNeil River Subdistrict, 1993.

	Age Group					
	1.1	1.2	1.3	2.2	2.3	total
Sample Period : 10 June						
Males	4	185	197	25	37	448
Percent	0.43	19.66	20.94	2.66	3.93	47.61
Sample Size	2	96	102	13	19	232
Mean Length	316	457	515	470	515	487
Std. Error		2	1	6	4	1
Sample Size	2	96	102	13	19	232
Mean Weight		1.24	1.70		1.99	1.52
Std. Error		0.07	0.08			0.05
Sample Size		10	9		1	20
Females	15	213	209	27	29	493
Percent	1.59	22.64	22.21	2.87	3.08	52.39
Sample Size	8	110	108	14	15	255
Mean Length	310	462	516	466	519	484
Std. Error	5	1	1	7	5	1
Sample Size	8	110	108	14	15	255
Mean Weight	0.40	1.21	1.59	1.02	1.97	1.38
Std. Error		0.05	0.05	0.04		0.03
Sample Size	1	18	12	2	1	34
Both Sexes	19	398	406	52	66	941
Percent	2.02	42.30	43.15	5.53	7.01	100.00
Sample Size	10	206	210	27	34	487
Mean Length	311	460	516	468	517	485
Std. Error	5	1	1	4	3	0
Sample Size	10	206	210	27	34	487
Mean Weight	0.40	1.22	1.64	1.02	1.98	1.45
Std. Error		0.04	0.05	0.04		0.03
Sample Size	1	28	21	2	2	54

Table 20. Age, sex, and size composition of sockeye salmon commercial catch from Douglas River Subdistrict (Silver Beach), 1993.

	Age Group								total
	0.2	0.3	1.2	2.1	1.3	2.2	1.4	2.3	
Sample Period : 25 June									
Males	32	43	267		342	11	21		716
Percent	2.56	3.44	21.34		27.34	0.88	1.68		57.23
Sample Size	3	4	25		32	1	2		67
Mean Length	488	571	462		581	523	571		531
Std. Error	25	14	7		5		1		3
Sample Size	3	4	25		32	1	2		67
Females		75	43	11	353	32		21	535
Percent		5.100	3.44	0.88	28.22	2.56		1.68	42.77
Sample Size		7	4	1	33	3		2	50
Mean Length		567	509	348	558	524		582	550
Std. Error		8	5		3	22		16	3
Sample Size		7	4	1	33	3		2	50
Both Sexes	32	118	310	11	695	43	21	21	1,251
Percent	2.56	9.43	24.78	0.88	55.56	3.44	1.68	1.68	100.00
Sample Size	3	11	29	1	65	4	2	2	117
Mean Length	488	568	469	348	569	523	571	582	539
Std. Error	25	7	6		3	22	1	16	2
Sample Size	3	11	29	1	65	4	2	2	117

Table 21. Age, sex, and size composition  
of chum salmon commercial catch  
from McNeil River Subdistrict,  
1993.

	Age Group		
	0.3	0.4	total
Sample Period: 14-28 August			
Both Sexes	312	62	374
Percent	83.29	16.71	100.00
Sample Size	155	21	176

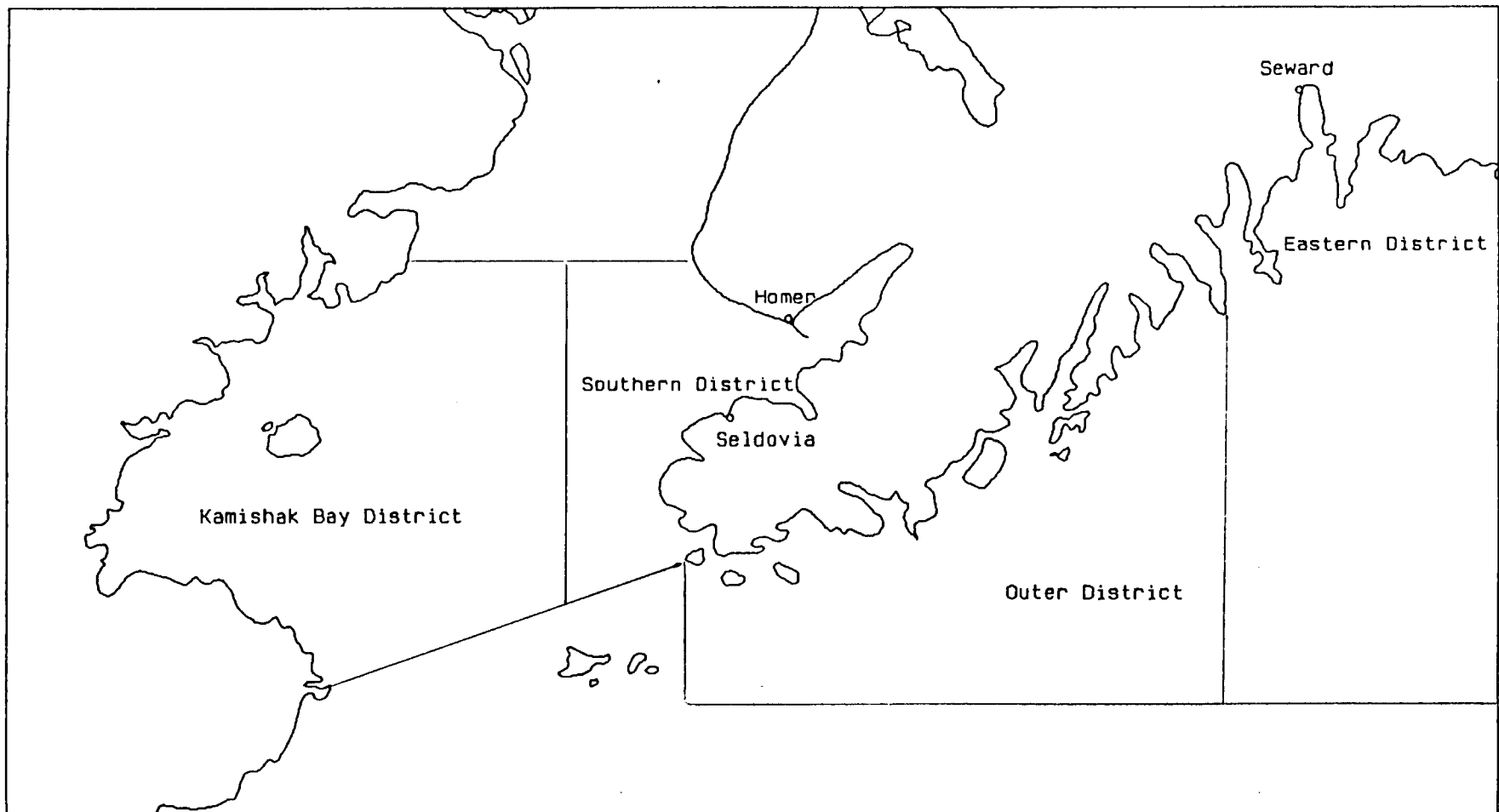


Figure 1. Kamishak Bay, Southern, Outer, and Eastern Districts of Lower Cook Inlet Management Area.

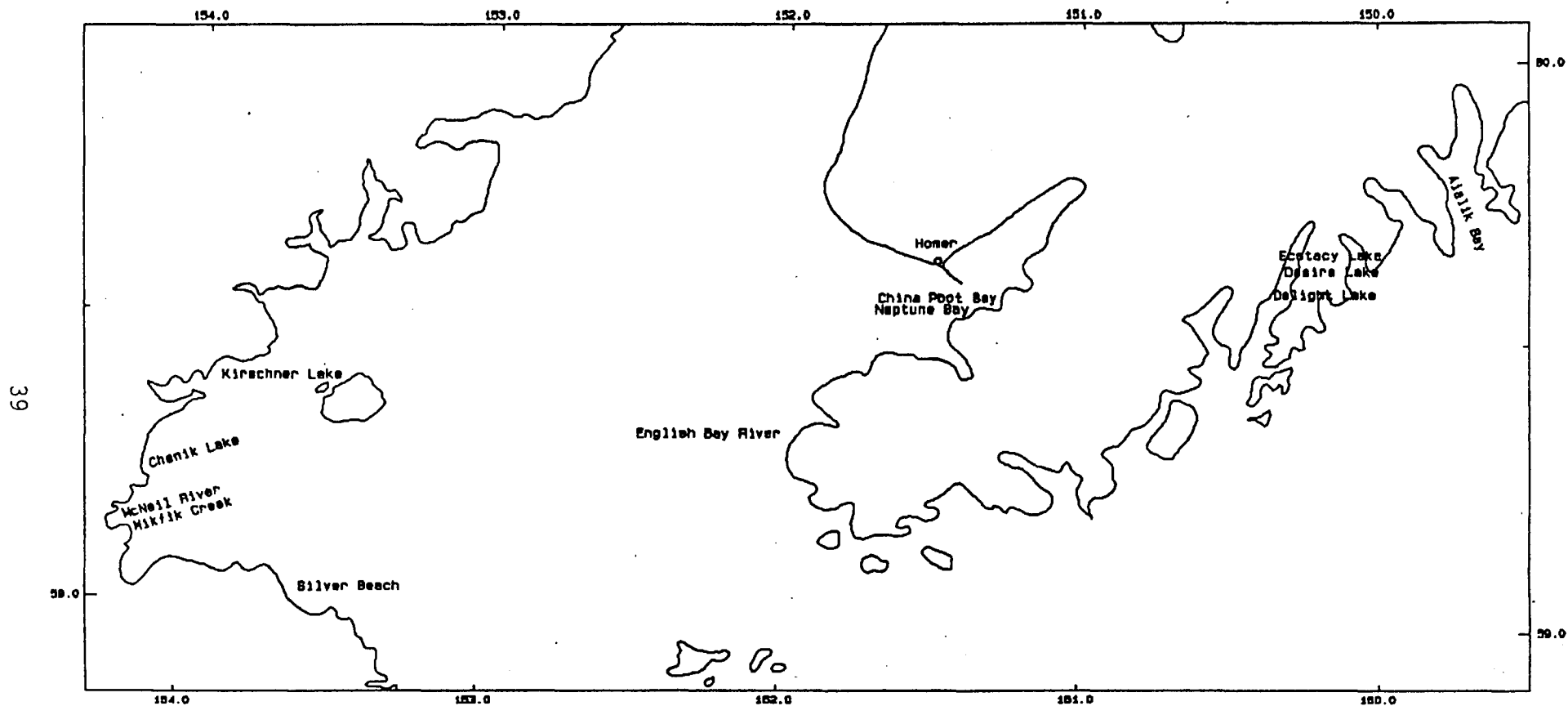


Figure 2. Lower Cook Inlet salmon catch and escapement sampling sites, 1993.

Appendix A.1. Aialik Lake sockeye salmon mean length, weight, and age by brood year and age group.

	Age Group														
year	0.2	0.3	0.4	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4
male mean length by brood year															
1975															
1976															
1977															
1978						581			534	586					
1979					502	581	648		529	582					
1980				355	515	569			510	571					
1981				400	500	566		380	498						
1982					496					581					
1983						581			512	607					
1984			561		517	590	610		539	610					
1985					521	613			545	571					
1986		659		367	541	566			498						
1987	478				496										
1988															
1989															
1990															
female mean length by brood year															
1975															
1976															
1977															
1978						557	546		530	565					
1979					499	557			512	548					
1980					493	551			493	547					
1981		539			497	544			501						
1982					496					564					
1983						555			506	579					
1984		516			502	563	632		526	594					
1985					506	579			520	547					
1986					529	544			501						
1987					496										
1988															
1989															
1990															
male mean weight by brood year															
1975															
1976															
1977															
1978						3.16			2.67	2.90					
1979					2.31	3.34	4.80		2.37	3.76					
1980					2.42	3.50			2.56	2.86					
1981					2.63	2.96		1.30	2.11						
1982					2.10					3.76					
1983						3.37			1.55	3.45					
1984					2.44	3.80			2.45	3.10					
1985					1.59	3.69			2.61	2.86					
1986				0.80	2.48	2.96			2.11						
1987					2.10										
1988															
1989															
1990															

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	Age Group														
year	0.2	0.3	0.4	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4
female mean weight by brood year															
1975															
1976															
1977															
1978						2.94	2.58		2.55	3.00					
1979					2.03	2.93			2.33	3.20					
1980					2.01	3.04			2.66						
1981		2.95			2.28										
1982															
1983						2.91			2.20	3.40					
1984					1.88	2.99			1.80	2.95					
1985					1.97	3.10			2.02	2.37					
1986					1.85	2.42			1.96						
1987					1.76										
1988															
1989															
1990															
male harvest by brood year															
1975															
1976															
1977															
1978															
1979															
1980															
1981															
1982															
1983						3,184			393	1,440					
1984			4		2,531	3,084	29		83	170					
1985					347	723			1,824	1,020					
1986		14		9	1,056	376			218	68					
1987	14				287	1,115				159					
1988					67	256			287						
1989					798										
1990															
female harvest by brood year															
1975															
1976															
1977															
1978															
1979															
1980															
1981															
1982															
1983						4,799			742	2,312					
1984		44			4,800	4,262	14		118	87					
1985					369	810			1,982	1,476					
1986					955	673			366	67					
1987					287	1,115				160					
1988					68	255			287						
1989					798										
1990															

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	Age Group														
year	0.2	0.3	0.4	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4
male age composition by harvest year															
1983				0.70	31.80	7.90			1.40						
1984				0.20	25.60	20.50			1.80	1.30					
1985					5.40	26.70	0.30	0.20	9.40	6.30					
1986					15.10	19.80			11.40	53.70					
1987	-----														
1988					12.50	15.73			1.94	7.11					
1989			0.05	0.11	4.06	36.12			0.97	1.99					
1990	0.18	0.18			13.75	9.41	0.38		23.74	2.27					
1991					6.10	7.99			4.64	21.69					
1992					2.68	44.60				2.72					
1993					26.60	8.53			9.57	5.30					
female age composition by harvest year															
1983					42.50	15.40			0.40						
1984					25.80	22.10	0.10		0.90	0.70					
1985		0.30			5.40	32.40			6.00	7.60					
1986					10.20	24.00			13.10	52.60					
1987	-----														
1988		0.22			23.71	23.70			3.67	11.42					
1989					4.32	49.92			1.38	1.08					
1990					12.43	10.54	0.18		25.80	1.13					
1991					6.10	14.31			7.78	31.38					
1992					2.72	44.60				2.68					
1993					26.60	8.50			9.57	5.33					

Mean AWL data in this appendix reflect all corrections to the database and supersede previously reported AWL data. However, this does not imply that the data is completely free of keypunch or aging errors. See text for details.



Appendix A.2. Nuka Bay sockeye salmon mean length, weight, and age by brood year and age group.

	Age Group														
year	0.2	0.3	0.4	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4
male mean length by brood year															
1977														534	
1978															
1979										573					
1980						571			508					570	
1981					500										
1982										582					
1983						573			537	594				581	
1984					507	579			543	572			538		
1985		617			518	576			503	574					
1986	530	585			497	579			516						
1987					504					568					
1988						567			520						
1989		579			515										
1990															
female mean length by brood year															
1977														547	
1978															
1979										539					
1980						549			498					565	
1981		547			487						506		503		
1982										559					
1983						558			508	565				551	
1984					500	557	549	325	511	550			517		
1985		502			504	549	585		481	553					
1986	512	553			482	555			495						
1987					491					551					
1988						556			504						
1989					491										
1990	488														
male mean weight by brood year															
1977															
1978															
1979										3.13					
1980						3.12			2.27						
1981					2.16										
1982										3.55					
1983						3.53			2.33					2.48	
1984					2.20	2.58				3.70			2.11		
1985					2.25	3.57			2.68	2.33					
1986	2.10				2.34	2.35			1.76						
1987					1.61					2.72					
1988						2.76			1.85						
1989					2.07										
1990															

-Continued-

	Age Group														
year	0.2	0.3	0.4	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4
female mean weight by brood year															
1977															
1978															
1979										2.66					
1980						2.65			1.94						
1981					1.88						1.95				
1982										2.89					
1983						2.69			1.83	2.65				2.24	
1984					2.45	2.48				3.07					
1985					1.80	2.87			1.89	1.99					
1986					1.91	1.99			1.37						
1987					1.43					2.38					
1988						2.32			2.19						
1989					1.83										
1990															
male harvest by brood year															
1977														209	
1978															
1979										2,713					
1980						30,057			2,922					28	
1981					3,757										
1982										1,993					
1983						1,123			562	466				7	
1984					281	2,579			93	242			4		
1985		31			1,398	1,401			453	216					
1986	31	14			408	358			82						
1987					56					728					
1988						478			166						
1989		28			353										
1990															
female harvest by brood year															
1977														209	
1978															
1979										4,592					
1980						33,395			6,053					28	
1981		209			7,514						28		28		
1982										1,854					
1983						1,544			1,011	870				15	
1984					674	2,734	5	28	280	320			4		
1985		31			1,740	1,789	4		501	279					
1986	31	28			567	494			142						
1987					112					713					
1988						471			208						
1989					367										
1990	7														
male age composition by harvest year															
1985					4.10	32.80			3.19	2.96				0.23	
1986															
1987															
1988					3.06	12.23			6.12	21.71				0.30	
1989	0.30	0.30			13.59	25.08			0.90	4.53					
1990		0.24			7.12	24.46			7.91	4.22					
1991					3.16	20.19			4.62	12.18			0.23	0.39	
1992															
1993		0.80			10.03	13.58			4.72	20.69					

-Continued-

	Age Group														
year	0.2	0.3	0.4	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4
female age composition by harvest year															
1985		0.23			8.20	36.45			6.61	5.01				0.23	
1986															
1987															
1988					7.34	16.82		0.30	11.01	20.19	0.30		0.30	0.30	
1989	0.30	0.30			16.92	26.58			2.72	8.46					
1990		0.49			9.90	31.23	0.09		8.75	5.59					
1991					6.32	27.86	0.23		8.01	15.74			0.23	0.85	
1992															
1993	0.20				10.43	13.38			5.91	20.26					

Mean AWL data in this appendix reflect all corrections to the database and supersede previously reported AWL data. However, this does not imply that the data is completely free of keypunch or aging errors. See text for details.

Appendix A.3. China Poot sockeye salmon mean length, weight, and age by brood year and age group.

	Age Group														
year	0.2	0.3	0.4	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4
male	mean length by brood year														
1972															
1973															
1974															
1975						512									
1976					515	540									
1977					489			436		580					
1978						542			507	565					
1979					514	526	568		513						
1980				422	494	539			497						
1981					481	504									
1982					498					546					
1983						534			510	558					
1984					498	560		379	513	530			437		
1985				351	489	554		407	479	554					
1986				366	474	524		352	485	541					
1987				361	478	546		359	493						
1988					484	541		398	518						
1989				383	495			394							
1990				761											
female	mean length by brood year														
1972															
1973															
1974															
1975						523			508						
1976					511										
1977					490			512		569					
1978						538	511		525						
1979					513	549			501	547					
1980					494	539			493						
1981					482				496						
1982					493		632			525					
1983						551			507	562					
1984					494	565		441	517	574			486		
1985				340	488	546			473	550					
1986					472	533			478	538					
1987					477	524			491						
1988					485	539			521						
1989					495										
1990															
male	mean weight by brood year														
1972															
1973															
1974															
1975						2.20									
1976					2.17	2.61									
1977					2.17			1.14		2.95					
1978						2.65			2.03	2.90					
1979					2.14	2.66	3.85		2.26						
1980				0.94	2.02	2.91			2.43						
1981					2.26	2.14									
1982					1.96					2.83					
1983						2.70			2.45						
1984					2.38	3.63		1.80	2.00						
1985				0.70	1.83	2.83			1.70	2.10					
1986				0.50	1.54	2.46			1.80						
1987				0.70	1.69	2.40		0.50	1.81						
1988					1.79				2.17						
1989				0.82	1.57										
1990															

-Continued-

year	Age Group												
	0.2	0.3	0.4	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2
female mean weight by brood year													
1972													
1973													
1974													
1975					2.40			1.95					
1976					2.00								
1977					1.98					2.70			
1978						2.85	2.50		2.03				
1979					1.98	2.80			1.97	2.88			
1980					1.90	2.91			2.26				
1981					2.11				1.70				
1982					1.80					2.20			
1983									2.07				
1984					1.77				2.75	2.60			
1985					1.76				1.51				
1986					1.49	2.10			1.63				
1987					1.57	2.10			1.72				
1988					1.67	2.51							
1989					1.54								
1990													

## male harvest by brood year

1972													
1973													
1974													
1975					152								
1976					5,620	136							
1977					3,394			272		266			
1978						133			266	216			
1979					32,845	1,941	190		1,509				
1980				655	55,632	6,444			8,528				
1981					15,161	4,781							
1982					6,694					1,406			
1983						1,326			17,249	307			
1984					12,862	1,324		1,174	2,592	68		384	
1985				1,126	16,595	1,823		35	2,904	322			
1986				153	7,429	2,141		203	16,172	386			
1987				540	25,628	1,157		452	15,044				
1988					16,073	2,295		643	2,868				
1989				1,543	19,789			287					
1990				287									

## female harvest by brood year

1972													
1973													
1974													
1975					456			304					
1976					5,468								
1977					6,926			272		133			
1978						266	216		266				
1979					39,360	647			4,097	569			
1980					40,106	5,117			6,633				
1981					14,783				956				
1982					2,869		56			514			
1983						1,567			14,203	229			
1984					11,876	915		113	1,567	68		192	
1985				56	12,078	1,283			4,457	619			
1986					11,008	3,015			17,386	129			
1987					22,622	1,029			14,400				
1988					13,244	2,008			2,008				
1989					38,146								
1990													

-Continued-

	Age Group														
year	0.2	0.3	0.4	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4
male age composition by harvest year															
1980					46.83	1.27									
1981					30.85	1.24		2.47							
1982															
1983				0.88	44.27	0.18			0.36	0.36					
1984					53.31	1.86			1.45	0.21					
1985					26.40	11.22	0.33		14.85						
1986					43.75	31.25									
1987															
1988				1.77	20.25	2.09		1.85	27.15	2.21					
1989				0.43	46.36	3.70		0.10	7.24	0.86					
1990				1.81	24.94	6.12		0.68	9.75	0.23					
1991					28.82	2.41		0.51	18.18	0.36			0.43		
1992				2.42	25.25	1.82		1.01	23.64	0.61					
1993				0.42	29.24	3.39		0.42	4.24						
female age composition by harvest year															
1980					45.57	3.80			2.53						
1981					62.96			2.47							
1982															
1983					53.05	0.36			0.36	0.18					
1984					38.43	0.62	0.21		3.93						
1985					25.74	8.91			11.55	0.99					
1986					18.75				6.25						
1987															
1988				0.09	18.69	2.47	0.09	0.18	22.36	0.81					
1989					33.74	2.56			4.38	0.64					
1990					36.96	4.31			14.96	0.23					
1991					25.44	3.39			19.55	0.70			0.22		
1992					20.81	1.62			22.62	0.20					
1993					56.36	2.97			2.97						

Mean AWL data in this appendix reflect all corrections to the database and supersede previously reported AWL data. However, this does not imply that the data is completely free of keypunch or aging errors. See text for details.

Appendix A.4. Mikfik Lake sockeye salmon mean length, weight, and age by brood year and age group.

	Age Group														
year	0.2	0.3	0.4	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4
male mean length by brood year															
1978														528	
1979															
1980						520	505			520					
1981									448						
1982					457					515					
1983						512			479	535					
1984					462	533			493	510					
1985					475	504			471	501					
1986					441	500			456	491					
1987					464	506			446	516					
1988					443	516			471						
1989					457										
1990				316											
female mean length by brood year															
1978															
1979															
1980										508				460	
1981						512			462						
1982		545			458					517					
1983						511			469	525					
1984					458	531			480	510					
1985					471	511			456	494					
1986					438	499			457	508					
1987					461	509			451	520					
1988					446	517			467						
1989					463										
1990				310											
male mean weight by brood year															
1978															
1979															
1980							1.55			1.75					
1981						1.76			1.20						
1982					1.27					2.50					
1983						2.21			1.53	1.87					
1984					1.66	2.06			1.37	1.80					
1985					0.90	1.91			1.25	1.64					
1986					1.45	1.73			1.21	1.65					
1987					1.51	1.72				1.99					
1988					1.19	1.70									
1989					1.24										
1990															
female mean weight by brood year															
1978															
1979															
1980										1.53					
1981						1.62			1.13						
1982		2.00			1.06										
1983						2.16			1.56						
1984					1.51	1.78			1.58	1.95					
1985					1.33	1.96			1.70	1.60					
1986					1.34	1.62			1.31	1.52					
1987					1.45	1.70				1.97					
1988					0.99	1.59			1.02						
1989					1.21										
1990				0.40											

-Continued-

	Age Group														
year	0.2	0.3	0.4	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4
male harvest by brood year															
1978														93	
1979															
1980						186				279					
1981					10,869				1,208						
1982					3,995					131					
1983						3,892			352	314					
1984					2,676	2,939			383	782					
1985					355	1,965			313	122					
1986					2,188	3,897			950	252					
1987					853	1,730			37	37					
1988					141	197			25						
1989					185										
1990				4											
female harvest by brood year															
1978															
1979														93	
1980										372					
1981					5,852				1,394						
1982		93			3,066					42					
1983						3,746			381	164					
1984					3,420	2,132			355	447					
1985					369	1,541			201	292					
1986					1,629	3,776			1,583	134					
1987					1,413	1,469			37	29					
1988					163	209			27						
1989					213										
1990				15											
male age composition by harvest year															
1986					14.53	39.52	0.68		4.39	1.01				0.34	
1987															
1988					18.28	26.58			2.40	0.89					
1989					5.06	41.92			5.46	4.48					
1990					24.13	21.67			3.45	8.63					
1991					6.62	30.24			7.37	0.95					
1992					3.56	43.65			0.93	6.36					
1993				0.43	19.66	20.94			2.66	3.93					
female age composition by harvest year															
1986		0.34			11.15	21.28			5.07	1.35			0.34		
1987															
1988					23.36	25.59			2.60	0.29					
1989					5.26	30.41			5.06	2.34					
1990					17.97	16.100			2.22	4.93					
1991					10.97	29.30			12.28	2.27					
1992					4.11	37.07			0.93	3.38					
1993				1.59	22.64	22.21			2.87	3.08					

Mean AWL data in this appendix reflect all corrections to the database and supersede previously reported AWL data. However, this does not imply that the data is completely free of keypunch or aging errors. See text for details.



Appendix A.5. Chenik Lake sockeye salmon mean length, weight, and age by brood year and age group.

	Age Group														
year	0.2	0.3	0.4	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4
male mean length by brood year															
1977															
1978															
1979															
1980						568									
1981					498	569			509						
1982					508		602			585					
1983						565			508	571					
1984					498	568		370	535	555					
1985					518	554			502	562					
1986		552			493	550			517						
1987	417				505	547									
1988					501	553			549						
1989					516			329							
1990															
female mean length by brood year															
1977															
1978															
1979							515			537					
1980						542			467						
1981		547			485	530			489						
1982					486					561					
1983						536			490	543					
1984					484	542			505	523					
1985					494	534		324	485	512					
1986		537			469	530			492	537					
1987					481	512									
1988					487	532			496						
1989					492										
1990															
male mean weight by brood year															
1977															
1978															
1979															
1980						2.81									
1981					2.08	2.20			1.75						
1982					1.64										
1983						2.60			1.98	2.30					
1984					1.71	2.50		0.90	2.18						
1985					2.05	2.37				1.99					
1986					1.82	1.71			1.59						
1987					1.40	2.10									
1988					1.60	2.11									
1989					1.37										
1990															

-Continued-

	Age Group														
year	0.2	0.3	0.4	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4
female mean weight by brood year															
1977															
1978															
1979										3.60					
1980						2.44									
1981		3.00			1.88	1.83			1.46						
1982					1.39										
1983						2.01			1.55	1.90					
1984					1.54	2.03			1.75						
1985					1.53	2.10			1.30						
1986					1.52	1.50			1.38	1.89					
1987					1.10	1.55									
1988					1.48	1.78									
1989					1.40										
1990															
male harvest by brood year															
1977															
1978															
1979															
1980						3,875									
1981					750	3,322			6,091						
1982					59,250		187			414					
1983						63,150			2,951	2,504					
1984					9,843	8,860		1,079	4,333	588					
1985					4,430	9,577			1,120	900					
1986		451			24,897	10,395			000						
1987	90				14,192	3,953									
1988					4,199	11,986			274						
1989					1,464			46							
1990															
female harvest by brood year															
1977															
1978															
1979															
1980						4,916	42		125	125					
1981		83			708	1,661			4,430						
1982					36,546					904					
1983						65,687			6,063	1,541					
1984					13,882	6,644			4,526	361					
1985					5,971	10,870		96	1,159	300					
1986		632			20,602	14,792			800	49					
1987					9,395	2,717									
1988					3,460	9,287			46						
1989					1,464										
1990															
male age composition by harvest year															
1985					7.06	36.47									
1986					53.23	2.98			5.47						
1987															
1988					5.100	38.47	0.11	0.66	1.80	0.25					
1989					11.39	22.77			11.14	6.44					
1990	0.13	0.64			35.39	13.61			1.59	0.84					
1991					27.41	20.08			1.93	1.74					
1992					29.20	27.49									
1993					5.96	48.79		0.19	1.12						

-Continued-

	Age Group														
year	0.2	0.3	0.4	1.1	1.2	1.3	1.4	2.1	2.2	2.3	2.4	3.1	3.2	3.3	3.4
female age composition by harvest year															
1985	0.78				6.66	46.27	0.40		1.18	1.18					
1986					32.84	1.49			3.98						
1987															
1988					8.46	40.01			3.69	0.55					
1989					15.35	17.08		0.25	11.63	3.96					
1990	0.90				29.29	15.45			1.65	0.51					
1991					18.15	28.57			1.55	0.58					
1992					24.06	18.90				0.34					
1993					5.96	37.80			0.19						

Mean AWL data in this appendix reflect all corrections to the database and supersede previously reported AWL data. However, this does not imply that the data is completely free of keypunch or aging errors. See text for details.

Appendix A.6. McNeil River chum salmon mean length, weight, and age by brood year and age group.

year	Age Group						
	0.2	0.3	0.4	0.5	1.2	1.3	1.4
male mean length by brood year							
1980							
1981			673	-----			-----
1982		627	-----	706	-----		
1983		-----	674	-----			-----
1984		620	-----		-----		
1985		-----	-----	-----	-----		-----
1986		-----	-----	711	-----		
1987		-----	689	-----			
1988		629					
1989							
1990							
1991							
1992							

female mean length by brood year							
1980							
1981			628	-----			-----
1982		630	-----	677	-----		
1983		-----	649	-----			-----
1984		610	-----		-----		
1985		-----	-----	-----	-----		-----
1986		-----	-----	703	-----		
1987		-----	659	-----			
1988		635					
1989							
1990							
1991							
1992							

male mean weight by brood year							
1980							
1981			4.55	-----			-----
1982		3.99	-----	5.78	-----		
1983		-----	4.92	-----			-----
1984		3.34	-----		-----		
1985		-----	-----	-----	-----		-----
1986		-----	-----		-----		
1987		-----	5.11	-----			
1988							
1989							
1990							
1991							
1992							

female mean weight by brood year							
1980							
1981			4.00	-----			-----
1982		3.71	-----	4.74	-----		
1983		-----	4.12	-----			-----
1984		3.09	-----		-----		
1985		-----	-----	-----	-----		-----
1986		-----	-----	4.24	-----		
1987		-----	4.63	-----			
1988		3.34					
1989							
1990							
1991							
1992							

-Continued-

year	Age Group						
	0.2	0.3	0.4	0.5	1.2	1.3	1.4

## male harvest by brood year

1980							
1981			2,149	-----			-----
1982		6,447	-----	4,945	-----		
1983			48,974	-----			-----
1984		4,656	-----				-----
1985							-----
1986				8	-----		
1987			1,283	-----			
1988		48	1,040				
1989		7,675					
1990							
1991							
1992							

## female harvest by brood year

1980							
1981			2,418	-----			-----
1982		2,686	-----	2,189	-----		
1983			38,037	-----			-----
1984		5,151	-----				-----
1985							-----
1986				40	-----		
1987			618	-----			
1988		44	1,040				
1989		7,675					
1990							
1991							
1992							

## male age composition by harvest year

1986	47.06	15.69		
1987				
1988	4.48	47.11	4.76	
1989				
1990				
1991				
1992	2.35	62.86	0.39	
1993	44.03	5.97		

## female age composition by harvest year

1986	19.61	17.65		
1987				
1988	4.96	36.59	2.11	
1989				
1990				
1991				
1992	2.16	30.28	1.96	
1993	44.03	5.97		

Mean AWL data in this appendix reflect all corrections to the database and supersede previously reported AWL data. However, this does not imply that the data is completely free of keypunch or aging errors. See text for details.

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